Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Digital Television Distributed Transmission	)	
System Technologies	)	MB Docket No. 05-312
	)	
	)	

Comments of Thomas C. Smith

February 6, 2006

Opening Comment

These comments are due in part to concerns I had raised in comments that I made in the Second Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television. In the Notice of Proposed Rulemaking for Digital Television Distributed Transmission System Technologies (DTS), I was quoted as expressing concerns that not enough was known about the performance of DTS and that increased interference could be caused by the use of DTS.

At that time, I felt there was insuffecent information to issue rules to implement DTS operation at that time. I did state that the FCC should allow a limited use of DTS to test its operation under Special Test Authority. I was mainly concerned about the interference between DTS transmitters within a single frequency system and the potential loss of service by viewers of these stations due to that interference. While interference between DTS transmitters will always be of concern, DTV receivers have greatly improved and our knowledge of digital transmission systems have increased since I voiced my concerns nearly three years ago. Costs of DTV equipment have also decreased as well as new equipment has been developed to make the impletation of digital systems easier. The use of GPS frequency and timing reference signals are now widely used and new equipment for synchronization and processing of digital video signals have also improved.

As someone who has worked in broadcast TV as a technician for over 36 years, I have seen many changes. I have also see the increase of competition from other video distribution systems. One of the reasons is because of the frustration of viewers in the use of broadcast TV because of reception problems. I would hope that DTS would help to solve some of those frustrations and not increase them. And if DTS technology can be used to

help create efficient translator and LPTV networks, that may aid in giving off-the-air viewers greater choices in programming.

Regulatory Status

The Commission asked in this Notice of Proposed Rulemaking if DTS transmitters for a full power DTV license should have primary status. In my comments in the Seconded Periodic Review of DTV, I stated that on-channel transmitters (for a full-power station) should have a primary status as long as the signal strengths of the DTS system transmitters do not exceed the signal strength at the edge of the normal coverage area of a full power single transmitter station. This is what others proposed in MB Docket No. 03-15 and the Commission seems to concur. The Commission should adopt primary status for all DTS transmitters within the normal coverage area of a full power licensed station.

Location and Service Area

I agree with the Commission that the coverage of a station using DTS should be comparable to what it would be if the station used a single transmitter and tower.

I feel that the proposed method of using a fixed radius based on mileage is the best method at this time to determine the maximum coverage that would be allowed for a Distributive Transmission System. When using a multiple transmitter system, it is likely that will not be possible to prevent some signal spillover outside the predicted coverage area of the station, had it been was using a single transmitter. The location of some transmitters to provide the needed coverage in problem areas and the fact that there are limitations to how tight antenna patterns can be controlled make some spillover inevitable. Until the end of the DTV transition, most stations will be operating at less then the maximum coverage that the proposed service radius gives. The area between the actual coverage allowed by many station interference limited replication service area and the proposed fixed radius limits for DTS stations should give a suitable buffer for any spillover. Case by case waivers should be available for stations with extremely distorted coverage areas such as stations located in mountainous areas.

I agree with the Commission that allowing stations to use DTS to expand coverage into the larger Designated Market Area (DMA) could give unfair advantage to a station and prevent new stations from going on the air. There are other ways to expend coverage into large DMA's such as translators.

As far as determining the reference location for the center of the coverage area, existing stations should use the reference point based on the its post

transition reference point which normally the same as its current analog transmitter and from which most station's have computed their coverage from. This reference is also is used in allocation rulemakings. For new stations, there are three possible references depending on the distance from existing stations. If the separation of the new station from existing stations were very close, the reference coordinates would be the same as when determining the location of a single transmitter facility. Coordinates would also be computed from that main transmitter location, if a station were using one high power transmitter and several small transmitters to fill problem reception areas. For stations using several smaller transmitters to cover their service area, they could use either the official coordinates of the community of license or the location of the transmitter closest to the community of license as long as they meant spacing requirements to existing stations

As far the "cherry picking" picking issue, the ideal coverage would be the same as using a single transmitter. But with a DTS system, there will be some differences. There will be some holes along the edge of the service area as it will be difficult to make all the transmitters antenna patterns fill the edges uniformly. Placing what amounts to a number of small circles to fill a large circle will leave some gaps. The size of the gaps will depend on the amount of overlap that can be allowed without large increases in interference between transmitters. There will also be loss of coverage due to interference between transmitters in parts of the overlap areas. Some of that area will be predicted interference zones and some will be because on poor DTV receivers and antennas which a broadcaster cannot control.

I would suggest that the commission add a rule that all applicants be required to show in the coverage maps that they provide with their applications, all predicted interference zones in overlap areas between transmitters and any holes in coverage due to transmitter location, particularly along the edge of the replication coverage area. The applicant would also be required to give population figures for these areas and describe the make up of the area such as is it rural, urban, industrial, etc and if any terrain shielding exists. Because these interference zones are going to exist, the Commission should make the station limit that affected population to a small percentage of the total population served. This would force stations to plan their system to minimize the effects of interference and coverage loss.

Power, Antennas Height and Emission Mask

The proposed rules for power, antenna height should allow for maximum flexibility in planning a Distributive Transmission System. By allowing for the same maximum power and height as a full power single transmitter

system, a station could use a main high power system and use DTS to fill problem reception areas. And if a station wished to use several small transmitters to cover their service area they could do that too. This would allow a station to design a system to cover their market for what they would believe would give the best reception, instead of everyone using what is now basically a one size fits all, a large transmitter with a tall tower.

As far as emission mask, the Commission should not make any changes. The current rules are already being used to determine receiver design and allocation issues.

Licensing Issues

The license should cover all the transmitters in a single same channel DTS system. Other services such as many wireless services use a single license to cover a service area. The transmitters also should use the same call sign. Broadcasters use a single license and call to cover a number of transmitters in any one broadcast auxiliary band. The viewer will consider it the same station, as he would get it on the same channel any place in the coverage area. The viewer watches a channel, not a transmitter, so why should we confuse him or her by giving a station several identities.

The Commission also raised the issue of "cherry picking" parts of a coverage area by possibly delaying service to some population groups when constructing transmitters. The ideal would be for a station to fire up all the transmitters at the same time. But technical problems do come up. I suggest that the Commission set a limited span of time to get all transmitters on the air. All the transmitters must be on by the three year limit the Commission currently sets for all stations, but the last transmitter must be completed within "X" numbers of months after the first one comes on. Waivers would be required if longer delays are unavoidable.

Coverage requirements should be 100% if possible over the city of license, but because of interference zones in overlap areas, that may not be totally possible. As I suggested earlier, the FCC should set the maximum percentage of persons affected by interference zones and stations describe the areas that these zones occur. Hopefully DTS will correct more reception problems such as ghosting and shadowing giving more viewers better service then before with losses due to interference zones being at a minimum.

Interference Protection

As DTS stations would be limited to serving the same areas that would be served by a single high power station, there should not be any increase in co-

channel interference or out of channel interference such as local oscillator interference. The one type of interference that may increase is adjacent channel interference. Normally adjacent channels in analog were located 55 miles apart. One transmitter s signal would decrease as it got nearer to the other transmitter. With DTV, an adjacent channel transmitter would either be 55 miles away or very close together. With some DTS transmitters being placed between two adjacent channel areas, that will be there will be higher signal strengths near these transmitters then occurred at the same location with two single transmitter stations. This could create some desired to undesired ratios that some receivers cannot handle. I have had experience with adjusting a cable headend and installing off-air antennas and found out that levels to receive adjacent channels require similar levels between the two channels on cable and very good antenna directivity for off-the air signals. Planning the power levels for transmitters in the area between the two adjacent markets will require study to determine the allowable desired to undesired signal ratios. These studies may need to be required with the application.

Technical Standards

I agree with the Commission that it is in the best interest of the licensee to minimize the interference between DTS transmitters. But by not mandating synchronizing standards, it will allow stations to experiment with different methods to correct interference. This is still a new technology and there may be answers to problems that we have yet to discover. The only standard that should be required is precision frequency control, either using a GPS reference or some other precision frequency reference. I doubt that any single frequency system will work very well if transmitters are allowed any frequency drift between them. That has seemed to be one of the difficulties in past single frequency systems including early synchronous AM transmission systems and more recently FM booster systems. Precise frequency control would seem a requirement in designing a system, but sooner or later someone will take a short cut and just feed a digital signal into a second transmitter to fill a problem spot without regard for potential interference problems between transmitters.

Class A, Low Power, Translators and Booster Stations

I agree with the Commission's proposal to allow Class "A" stations to build single frequency networks. This would allow Class "A" stations to complete with full power stations on a more equal basis by allowing them to serve a larger area. Even if they do not compete directly with a full power service, any thing that would help Class "A" stations survive and give them a base to provide a new local service would be helpful. Any additional transmitters in

a Class "A" DTS network should get primary status if they can show that they would not preclude a full power station on that channel from being allocated in the area.

The use of DTS for Class "A" and LPTV within their predicted coverage areas may also help in their survival. With a Class "A" or LPTV operating on the UHF band with a power level of up to 15 KW ERP, they may have a coverage area of around 30 miles. That would give them many of the same reception problems as a full power station and DTS may help in solving them. A DTS transmitter serving a Class "A" or LPTV station within its predicted contour could be licensed with the main Class "A" or LPTV station.

The Commission quoted the Merrill Weiss Group as suggesting the use of DTS to expend a station's coverage over the larger DMA of a stations market. While I do not agree with that proposal, I would suggest that the Commission allow for separately licensed translators using DTS technology on the same frequency as the main full power station. Many times in the less congested parts of the nation co-channel and adjacent channel stations are separated by more distance then the minimum spacing allowed for in the rules. These white areas are served by a station's over-the air signal which can be used, due to viewers making extra efforts to receive them by using large antenna systems and signal amplifiers. This may be one method to better serve these viewers particularly where additional channels were not available for translators in the past. The use of translators using the same frequency as the stations main transmitter may also be more spectrum efficient.

Finally, translators and LPTV stations should remain secondary to full-power TV stations. It is always better to provide a new service that increases the diversity of programming for the most people. And DTS has the possibility to continue translator service even when additional frequencies are not available.

Closing Summary

When I wrote my comments nearly three years ago, I was concerned that DTV might not be successful and that any system that would increase problems in reception to the average viewer should be studied carefully. DTV sets were not selling that well yet and many consumers were not even aware of DTV. DTV sets are now starting to outpace the sale of analog TV's and Congress has set the deadline for the end of analog TV. There is still a lot of consumer confusion, but now is the time to make DTV work. Broadcasters and the consumer electronic industry need to educate the viewer on DTV and the FCC has to allow the industry to continue to have the ability to compete with other technologies.

I now believe that the Commission should have information on Distributive Transmission Systems to determine if it can be commonplace. DTV receivers have improved in the past three years and we have seen the growth in many new technologies in the transmission of digital signals. The Commission should be able to set the basic rules for DTS. This is not to say that the Commission will not have to revisit and modify the rules at a later date, but I suspect that there will be a number of rule changes needed at the end of the DTV transition.

As a broadcast technician, I have received comments for years that someone was having problems receiving a station even when they were in what I thought was a good reception area. One reason people turned to other delivery systems like cable was these reception problems. Unlike other wireless services, broadcasters have no control over the design of the receiver equipment and the installation of that equipment. We have to make the reception of our signals as easy as possible. Because of the shortage of spectrum, translators were not an answer. DTS may be that answer. In any case, we must make it easier for the viewer to receive our signals and programming.

One of the other reasons that people went to cable and satellite was lack of choice in broadcast programming. With the possibility of DTS networks for Class "A" stations, along with multicasting and maybe some new open channel space within the remaining TV band due to possible spectrum efficiently gains by the elimination of UHF taboos, maybe broadcast TV can provide greater program choice then it has in the past.

Finally, there may be savings for the broadcaster in building several small transmitter facilities; with the cost of lower power transmitters and antennas being a fraction of higher powered ones. Several shorter towers should be less costly then a 1000-foot or higher tower, but the cost of several pieces of land and the zoning problems may out weigh the cost of a tall tower. Being able to co-locate on a tall tower or several short towers also affects the possible costs and selection of transmitting system.

Having been in broadcasting for over 36 years, I want to see it survive. I also want to have choices of how I get my television programming. Broadcasting is still the only source of diversity in local programming. Any thing that will help strength broadcast TV should be at least tried. While some have written broadcast TV off, I believe that we may complement and even provide some of the new video delivery services as well as any other technology. I only would like the tools and chance to see it happen.

The views expressed do not represent anyone other than myself.

Respectfully submitted

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